Remarks/Arguments:

Claims 1, 4-8, 11-15, 18-22, 25-28, 30-31, 33-34, 36-37 and 39 have been amended. No new matter is introduced herein. Claims 1 - 41 are pending.

Claims 1, 8, 15, 22, 30, 33, 36 and 39 have been amended to clarify that the non-piezoelectric photonic crystal has first and second waveguides separated by a region of the photonic crystal. The first and second waveguides have a coupling length where the first waveguide is proximate to the second waveguide. These claims have also been amended to clarify that there is a means for inducing a change in conductance in the region of the photonic crystal along the coupling length such that the change in conductance produces electro-optical switching between the first and second waveguides. No new matter is introduced herein. Basis for the amendment can be found, for example, at p. 3, lines 12-23; p. 6, lines 5-23; p. 11, lines 3-21; and Fig. 1. In addition, claims 31, 34, and 37 have been amended to correspond with respective claims 1, 8, and 15. Claims 4-7, 11-14, 18-21 and 25-28 have been amended to be consistent with the specification at p. 7, lines 1-10; p. 8, line 5-p. 10, line 19; and Fig. 2.

Claims 1-29, 31, 32, 34, 35, 37, 38, 40 and 41 have been rejected under 35 U.S.C. § 102(b/e) as being anticipated by Allan et al. (U.S. 2002/0021878). It is respectfully submitted, however, that these claims are patentable over the cited art for the reasons set forth below.

Claim 1, as amended, includes features neither disclosed nor suggest by the cited art, namely:

> ...a non-piezoelectric photonic crystal having first and second waveguides separated by a region of the photonic crystal...
>
> ...each of the first and second waveguides having... a coupling length where the first waveguide is proximate to the second waveguide...
>
> ...electrical means or optical means for inducing a change in conductance in the region of the photonic crystal along the coupling length...
>
> ...the switch is configured such that the change in the conductance produces electro-optical switching between the first and second waveguides... (Emphasis Added)

Claims 8, 15 and 22 include similar recitations.

Allan et al. disclose, in Fig. 14, a planar photonic crystal defect waveguide device including a photonic crystal slab 100 having defect waveguide 102. Photonic

crystal slab 100 includes lower clad region 104 and upper clad region 106 that are each a volume of space contiguous with the respective bottom surface and top bottom surface of defect waveguide 102. Lower clad region 104 and upper clad region 106 each encompasses an evanescent tail of an optical signal propagating in defect waveguide 102. (Paragraph [0056]). Allan et al. further disclose that "propagation of an optical signal is controlled by varying an optical property of the lower clad region 104, the upper clad region 106 or both clad regions 104 and 106" (Paragraph [0056]) (emphasis added). Accordingly, Allan et al. teach that the evanescent tails of the optical modes that extend into the lower and/or upper clad regions are varied to control propagation of an optical signal.

Allan et al. disclose, in Fig. 25, a 2x2 switch using a pair of defect waveguides 170 and 172 in a directional coupler configuration (Paragraph [0064]). In the coupling region, each of controllable regions 173 and 174 of respective defect waveguides 170 and 172 are controlled by an electro-optic polymer slab in contact with the photonic crystal slab 110 (shown in Fig. 17). In paragraph [0064], Allan et al. disclose that "controllable regions 173 and 174 may be controlled by an electric field between an electrode above the electro-optic polymer slab and an electrode below the lower clad region to modulate the effective refractive index of the electro-optic polymer" (emphasis added). Accordingly, Allan et al. again teach that propagation of an optical signal in each individual defect waveguide 170,172 is controlled by varying the optical properties of each respective lower clad region (to vary the corresponding evanescent tail).

Allan et al. do not disclose or suggest applicants claimed features of "a non-piezoelectric photonic crystal having first and second waveguides separated by a region of the photonic crystal... electrical means or optical means for inducing a change in conductance in the region of the photonic crystal along the coupling length" (emphasis added). The subject invention comprises means for changing the optical properties of the actual defect waveguide region itself. In contrast, Allan et al. control the propagation of the optical signal by varying the optical properties of the upper and/or lower clad regions for an individual waveguide and thus change the evanescent tail of the optical modes extending in the upper and/or lower clad regions (See Abstract and paragraph [0056] of Allan et al.) Thus, Allan et al. do not include all of the features of claim 1. Accordingly, allowance of claim 1 is respectfully requested.

Claims 2-7, 29 and 31 include all of the features of claim 1 from which they depend. Accordingly, claims 2-7, 29 and 31 are also patentable over the cited art for at least the same reasons as claim 1.

Amended claims 8, 15, and 22, although not identical to claim 1, include features similar to claim 1 that are neither disclosed nor suggested by the cited art. Namely, first and second waveguides separated by a region of a non-piezoelectric photonic crystal and electrical means or optical means for inducing a change in conductance in the region of the photonic crystal along a coupling length. As discussed above, these features are neither disclosed nor suggested by Allan et al. Thus, Allan et al. do not include all of the features of claims 8, 15 or 22. Accordingly, allowance of claim 8, 15 and 22 is respectfully requested.

Claims 9-14, 16-21, 23-28, 32, 34, 35, 37, 38, 40 and 41 include all of the features of respective claims 8, 15 and 22 from which they depend. Accordingly, these claims are also patentable over the cited art for at least the same reasons as respective claims 8, 15 and 22.

Claims 30, 33, 36 and 39 have been have been rejected under 35 U.S.C. §103(a) as being unpatentable over Allan et al. in view of Augusto (U.S. 2002/0101895). It is respectfully submitted, however, that these claims are patentable over the cited art for the reasons set forth below.

Claim 30 includes features neither disclosed nor suggested by the cited art, namely:

> ...a non-piezoelectric photonic crystal having first and second waveguides <u>separated by a region of the photonic crystal</u>...
>
> ...each of the first waveguide and the second waveguide have a coupling length where the first waveguide is proximate to the second waveguide...
>
> ...means for inducing a change in conductance <u>in the region of the photonic crystal</u> along the coupling length...
>
> ...the switch is configured such that the change in the conductance produces electro-optical switching between the first and second waveguide...
>
> ...the change in conductance along the coupling length is optically induced by electron-hole pair generation... (Emphasis Added)

Claims 33, 36, and 39 include similar recitations.

Allan et al. are discussed above. Allan et al. do not disclose or suggest that a non-piezoelectric photonic crystal has first and second waveguides separated by a region of the photonic crystal and means for inducing a change in conductance in the region of the photonic crystal along the coupling length. In addition, as acknowledged by the Examiner on page 5 of the Office Action, Allan et al. do not disclose or suggest that a change in conductance is optically induced by electron-hole pair generation. Thus, Allan et al. do not include all of the features of claim 30.

Augusto discloses a device having wavelength-selective active layers arranged in a vertical stack so that photons of different energies are selectively absorbed in or emitted by the active-layers (Abstract). Augusto does not make up for the deficiencies of Allan et al. because Augusto does not disclose or suggest a non-piezoelectric photonic crystal having first and second waveguides separated by a region of the photonic crystal and means for inducing a change in conductance in the region of the photonic crystal along the coupling length, as required by claim 30. In addition, Augusto does not disclose that a change in conductance is optically induced by electron-hole pair generation. Instead, Augusto discloses changing photon emission and/or absorption characteristics by the active layers (Abstract). Thus, the combination of Allan et al. and Augusto does not disclose all of the features of claim 30. Accordingly, allowance of claim 30 is respectfully requested.

Amended claims 33, 36, and 39, although not identical to claim 30, include features similar to claim 30 that are neither disclosed nor suggested by cited art. Namely, first and second waveguides separated by a region of a non-piezoelectric photonic crystal and means for inducing a change in conductance in the region of the photonic crystal along a coupling length. As described above, Allan et al., Augusto, either alone or in combination, do not disclose all of these features. Accordingly, allowance of claims 33, 36, and 39 is respectfully requested.

In view of the amendments and arguments set for the above, the above-identified application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,

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Michele McDevitt